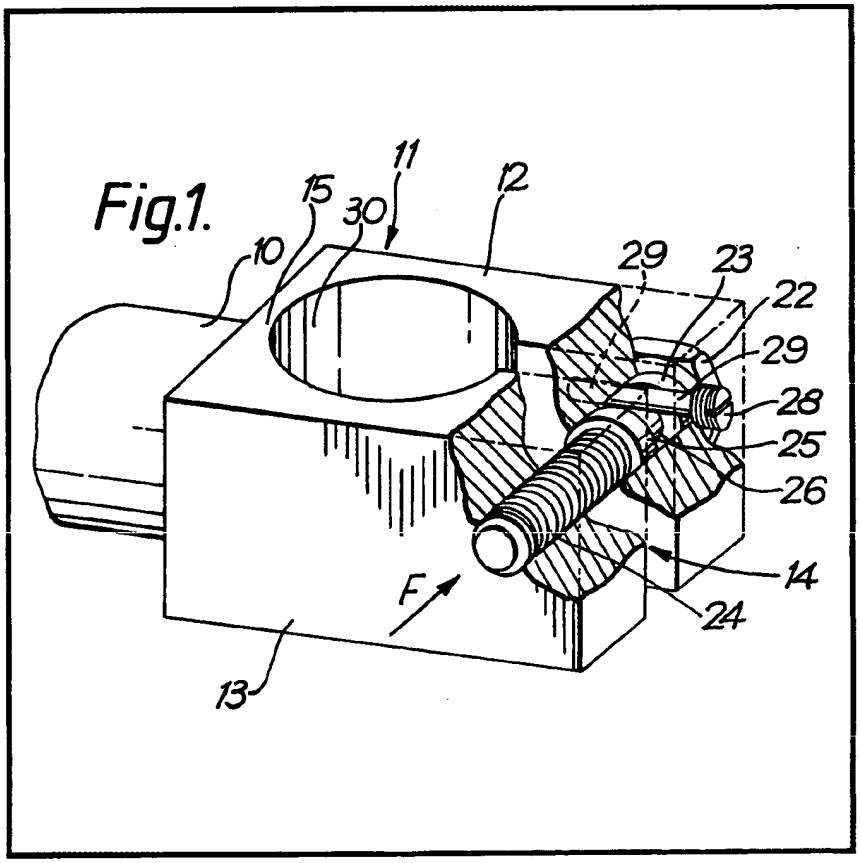
(12) UK Patent Application (19) GB (11) 2 031 508 A

(21) Application No 7930926
(22) Date of filing
6 Sep 1979
(23) Claims filed
6 Sep 1979
(30) Priority data
(31) 51070
(32) 13 Sep 1978
(33) Italy (IT)
(43) Application published
23 Apr 1980
(51) INT CL³ F16B 2/10
(52) Domestic classification
E2A 306 372 428 GD
(56) Documents cited
GB 427202
GB 383451
GB 354949
(58) Field of search
E2A
(71) Applicant
Giulio Gentile
Via San Martino al
Monti No 8
Rome Italy
(72) Inventor
Giulio Gentile
(74) Agents
G F Redfern & Company

(54) Screw clamp devices

(57) Known screw clamp devices comprise two jaws normally integral with a common base, and a tightening screw engaging both jaws. It is known for the inherent resilience of the material of which the jaws and base are made to be such that the jaws, once tightened onto a member, do not slacken off when the tightening screw is unscrewed.

This problem is overcome by making part of the tightening screw and one of the jaws in such a manner that said screw is freely rotatable whilst being held against movements relative to said one jaw in the direction of the longitudinal axis of said screw, and by making another part of said screw and the other jaw with complementary external and internal screw threads, respectively.



GB 2 031 508 A

Fig.1.

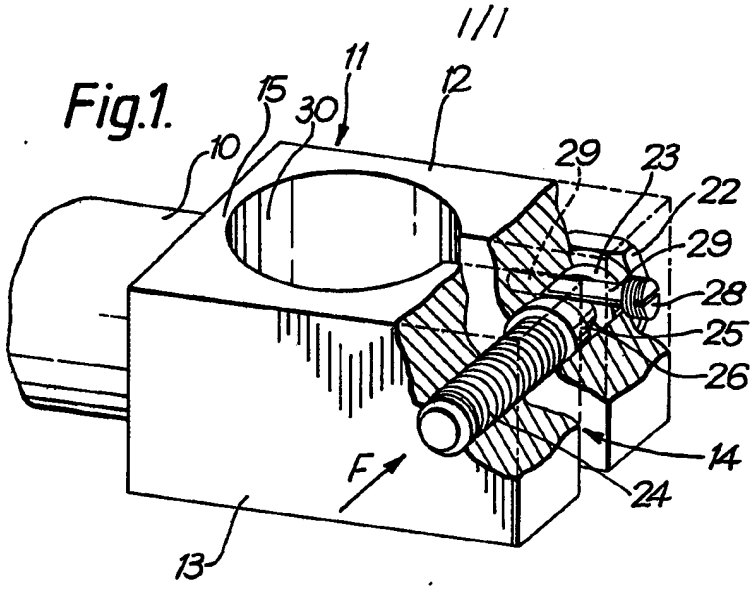


Fig.2.

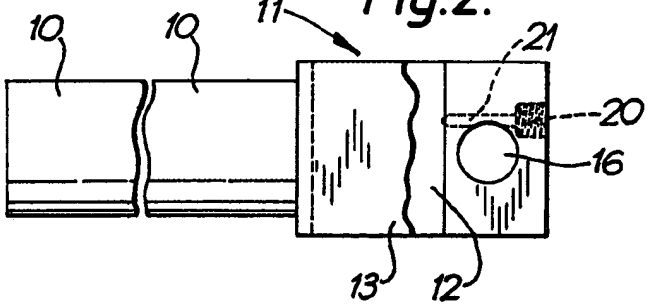


Fig.6.

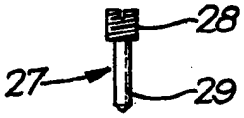


Fig.3.

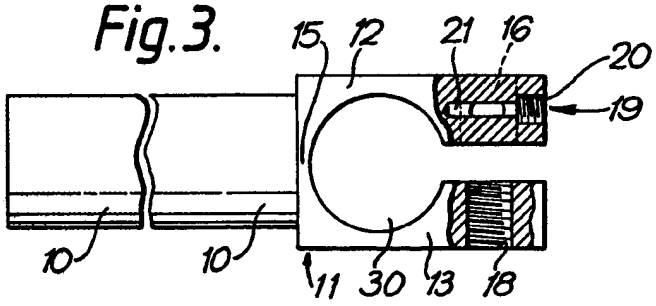


Fig.5.

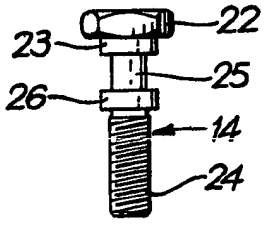
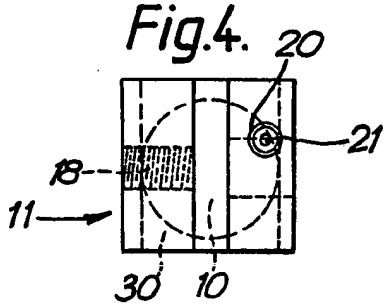


Fig.4.



SPECIFICATION

Screw clamp devices

The invention refers to an improvement in clamp devices of the screw type that is particularly, but not exclusively used in the articulated systems for externally exerting a holding action on bone tissues.

Screw clamp devices usually comprise two jaws normally integral with a single base portion, joined together by a tightening screw, the piece to be tightened being placed between the two jaws.

The two jaws are usually in the spaced or opened position due to the inherent resilience of the material of which they are made. These jaws are tightened by suitably operating the tightening screw joining the same, namely screwing the screw that has its head received into one jaw and the threaded shank screwed into a suitable cavity or bore formed in the other jaw.

The devices used at present, all having this rather simple structure and wherein untightening of the clamp is obtained unscrewing the tightening screw and relying on the inherent resilience of the material tending to return the jaws to the opened position, operate quite satisfactorily where there is no need of close tolerances between the jaws of the device and the member to be tightened thereby.

The operation of these devices, however, is no longer satisfactorily where there are close tolerances between the jaws and the piece to be tightened and, more particularly, when the piece to be tightened is a cylindrical rod and the holding surfaces of the jaws are so shaped as to tightly grip the cylindrical rod with close tolerance limits between the rod diameter and the diameter of the bore formed partly on one jaw and the other.

As a matter of fact, under these conditions, it often happens that the jaws tightened on the piece seize thereon and do not open when the tightening screw is loosened since the inherent resilience of the jaws is not sufficient to cause the jaws to return elastically to the opened position.

This is a very serious drawback in articulated systems for externally exerting a holding action on bone tissues, such as external fixators, where there are the above-mentioned close tolerances. As a matter of fact, when using these fixators it is often necessary to quickly untighten one or more clamps, vary the spatial position of the devices or the supports therefor and then tighten the loosened clamps again.

It is an object of this invention to overcome this drawback providing a clamp wherein the jaws are tightened by tightening the tightening screw therefor and these jaws are untightened by loosening the tightening screw without relying on the inhereint resilience of the jaws themselves. This can be obtained using means locking the head of the tightening screw to the respective jaw.

According to a preferred embodiment of the invention, the above-mentioned means comprise an annular groove formed in the shank of the tightening screw adjacent to the head thereof and a pin screwed into a suitable bore crossing the bore receiving the shank of the tightening screw so that the pin, being received in the annular groove, locks the tightening screw in respect of axial movements, yet allowing the same to rotate freely.

The invention will now be described in detail with reference to the annexed drawing, wherein:

Figure 1 is a perspective view, partially cutaway of the clamp according to the invention;

Figure 2 is a side elevational view of the clamp;

Figure 3 is a similar elevational view, partially cut-away;

Figure 4 is an end view of the clamp of Fig. 1;

Figure 5 shows in detail the tightening screw; and

Figure 6 shows in detail the pin locking the screw of Fig. 5 in respect of axial movements.

Particularly with reference to Fig. 1, the improved clamp according to the invention essentially comprises a shank 10, a head 11, two jaws 12 and 13 integral with head 11 and a tightening screw 14.

Jaws 12 and 13 are integrally formed with a common portion 15 and two aligned bores 16 and 18, respectively (Fig. 3), are formed therein.

Bore 18 has a slightly smaller diameter and is threaded while bore 16 is unthreaded and is tangentially crossed by a blind bore 19 having an initial threaded length 20 of a greater diameter and an unthreaded length 21.

Screw 14 is adapted to be fitted into the clamp according to the invention while head 22 is outside of jaw 12, length 23 comprising groove 25 within bore 16 of jaw 12 and threaded portion 24 screwed into threaded bore 18 of jaw 13.

Finally, once screw 14 is thus mounted, pin 27 is fitted into bore 19 to screw threaded head 28 thereof in the correspondingly threaded length 20 and cause shank 29 to be received in length 21 and consequently within groove 25 of screw 14.

It is evident that, with such an arrangement, the clamp will be tightened on a cylindrical rod (or, for example, on a shank 11 of a second clamp), received within bore 30 formed on jaws 12 and 14, by tightening screw 14, for example by acting with a suitable wrench on head 22, and it will be untightened without failure loosening the same screw. Loosening of screw 14 will cause this screw to axially move in the direction of

arrow F (Fig. 1) in respect of jaw 13 and jaw 12 to move in the same direction due to the engagement of embossment 26, downwardly defining groove 25, length 29 of pin 27 being received within bore 21.

From the foregoing it is evident that the clamp according to the invention will satisfactorily operate both in the tightening and untightening operations.

It is intended that changes and modifications can be made to the invention as described and illustrated above without departing from the scope and concepts thereof.

CLAIMS

1. In a clamp device comprising: a common base portion; a first jaw connected to said common base portion and having a transversal bore; a second jaw connected to said common base portion also having a transversal bore aligned with the previously mentioned transversal bore and suitably threaded; a tightening screw having a head, a shank portion adjacent to said head adapted to be received within said transversal bore of said first jaw and the remaining shank portion being threaded to be screwed into said transversal threaded bore of said second jaw, the improvement comprising means for preventing the axial movements carried by said first jaw and adapted to cooperate with matching means carried by the shank portion of said tightening screw adjacent to said head in order to prevent any relative axial movements of said screw in respect of said first jaw, yet allowing the same to rotate freely.

2. The improvement according to claim 1, wherein said means for preventing the axial movements comprise an annular groove formed on said shank portion of said screw adjacent to said head and a pin adapted to be received within a bore formed in said first jaw tangentially to said bore thereof so that said pin, when fitted into said tangential bore, is received within said groove of said tightening screw when the latter is fitted in place within said two aligned bores of said two jaws.

3. The improvement according to claim 2, wherein said tangential bore has an initial threaded length and said pin has a correspondingly threaded head adapted to be screwed thereinto to lock said pin in place.

4. A screw clamp constructed, arranged and operable substantially as hereinbefore described with reference to and as illustrated in the accompanying drawing.

5. Any features of novelty, taken singly or in combination, of the embodiment of the invention hereinbefore described with reference to the accompanying drawing.

Printed for Her Majesty's Stationery Office
by Burgess & Son (Abingdon) Ltd.—1980.
Published at The Patent Office, 25 Southampton Buildings,
London, WC2A 1AY, from which copies may be obtained.